

NEW SPECIES OF *CALOCHORTUS* (LILIACEAE) AND
LINUM (LINACEAE) FROM NORTHERN MEXICO

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ABSTRACT

Two new species are described from a localized gypseous area in southwestern Nuevo Leon; plants of both apparently grow only on the outcrops. *Calochortus marcellae* is most closely related to *C. barbatus*, *C. pringlei*, and *C. fuscus*. *Linum gypsogenium* is most closely related to *L. scabrellum*.

Collections of vascular plants from an area of gypsum outcrops in southeastern Nuevo Leon near the Tamaulipas border have included several previously unrecognized species. Two of these are described below; descriptions of others are being prepared by Dr. B. L. Turner and other specialists of various groups.

Calochortus marcellae Nesom, sp. nov.

Species nova *C. barbato*, *C. pringlei*, et *C. fusco* proxima, axillae foliorum superiorum bulbillis flores crateriformi-campanulati sepala purpurea petala carmina obscura obovati-elliptica apicibus acutis vel aliquantum obtusis non barbatis infra glandem pili glandis basaliter connati (Fig. 1).

Similar in habit to *C. barbatus*. Bulb ovoid with thick, fibrous-reticulate coats. Stems slender, erect, 25–48 cm tall, sometimes branched. Basal leaf up to 6 mm wide, equalling the stem-inflorescence height, the upper leaves not amplexicaul, the axils of upper leaves and bracts bulbiferous. Inflorescence 1–3 flowered; pedicels 28–85 mm long. Flowers crateriform-campanulate, nodding; petals dark carmine, drying brownish and sometimes with a yellowish tinge inside, elliptic to obovate-elliptic with acute to slightly obtuse apices 4.5–8 mm wide, 11.5–16 mm long, sparsely to densely bearded above the glandular spot with thick, bright yellow hairs, the glandular spot slightly depressed, bordered above by hairs basally fused to form a short membrane; sepals purplish-red, glaucous outside, drying purple to blue and sometimes with a yellowish tinge inside, narrowly oblanceolate-elliptic with acuminate to acute apices, 3.5–6 mm wide, 10–15 mm long, the hairs of beard very sparse and limited to a cluster in the sepal center, rarely extending upward; anthers oblong, 2.5–3.1 mm long, apiculate, the filaments basally dilated, 3.5–4.1 mm long;

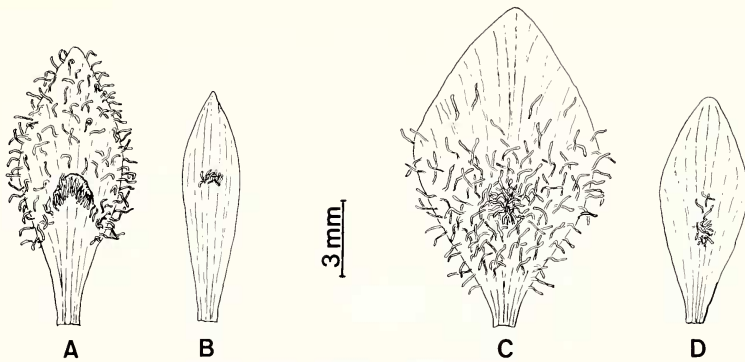


FIG. 1. Perianth morphology of *Calochortus* species. A-B. *C. marcellae* (type). A. Petal. B. Sepal. C-D. *C. barbatus* (Rose and Painter 6457-US). C. Petal. D. Sepal.

ovary linear, glaucous. Young fruit very narrowly elliptic, not winged, mature fruit and seeds not observed.

TYPE: México, Nuevo León, ca. 30 km ene. of Doctor Arroyo, 2.5 km ene. of San Antonio de Peña Nevada, w. base of Cerro Peña Nevada, large area of gypsum outcrops, ca. 1980 m, 3-5 Aug 1981, *Nesom 4280* (Holotype: US; isotypes: CAS, ENCB, MEXU, NY, TEX, to be distributed).

PARATYPE: México, San Luis Potosí, ne. slopes of hills near Aguaje de García in the Sierra de Guadalcázar, 1980 m, 1 Oct 1954, *Sohns 1497* (US).

With its monochasial inflorescence, fibrous-reticulate bulb coat, nodding flowers, and conspicuously bearded petals, *Calochortus marcellae* belongs to *Calochortus* sect. *Cyclobothra* subsect. *Barbata* as delimited by Ownbey (1940). Related species differ from *C. marcellae* as follows: *C. fuscus* Schultes f. has subclasping leaves, narrower petals, and brownish-purplish corollas; *C. barbatus* (HBK) Painter produces no, or rarely very few and small, bulbils in the leaf axils, its petals are bearded to below the gland, and the beard hairs of the gland are not basally fused; *C. pringlei* B. L. Robins. has much more shallowly and widely campanulate flowers, its petals are broadly truncate apically, and the beard hairs of the gland are not basally fused. Fresh corollas of *C. marcellae* are deep red, apparently similar to *C. pringlei*, but they sometimes dry with a yellowish tinge inside, suggestive of *C. barbatus* coloration. Flowers of *C. barbatus* rarely may have purplish-red, more or less glaucous (abaxially) sepals and reddish petals (e.g., *Palmer 415-US* and *Pennell 18833-US*) as in *C. marcellae*, but there is always a conspicuous yellow color inside the corolla. Corollas of *C. barbatus* typically are distinctively yellow inside and out. Color forms (dried) of *C. marcellae* resembling *C. barbatus* can easily be separated

by the abundant production of bulbils and the bearding pattern of both the petals and sepals (Fig. 1). In the new species, the beard hairs are not produced below the petal gland and usually do not extend upward above the cluster of hairs on the sepal. The conspicuous basal fusion of the beard hairs is similar to that found in *C. fuscus*. According to Ownbey (1940), the structure known as the "gland" does not seem to be always glandular" On the petals of *C. marcellae* it is simply a very small region of slightly thickened and translucent tissue strictly confined to the area immediately below the fused bases of the central arc of hairs and usually hidden from view by the hairs. On the sepals, there does not appear to be any similarly differentiated tissue.

The new species, like *Calochortus pringlei*, has a very restricted distribution compared to *C. barbatus*. The Sohns collection was made 150 km southwest of the type, but according to Ownbey's distributional data (1940), both known localities of *C. marcellae* are considerably northeast of the range of any of its relatives; it is geographically as well as morphologically distinct.

At the type locality, plants of *Calochortus marcellae* apparently are restricted to the gypsum outcrops in shallow soil accumulations. They are abundant and almost always sheltered under large shrubs or mixed in relatively large clumps of other herbaceous or suffruticose species.

The new species is named for my wife, also a redhead, who assisted in making the 1981 collections of gypsophytes.

***Linum gypsogenium* Nesom, sp. nov.**

A *L. scabrello* caulium et foliorum pubescentia stipitati-glandulosa praecipue differt (Fig. 2).

Perennial herbs with a woody taproot, 24–30 cm tall, similar in habit to *L. scabrellum* and *L. rupestre*, branched at or near the base and in the inflorescence, spreading pubescent throughout with simple hairs 0.1–0.3 mm long, ca. $\frac{1}{2}$ – $\frac{3}{4}$ of the hairs stipitate with large, orange glands. Leaves opposite and overlapping near the plant base, alternate and separated above, linear lanceolate, 4–8 mm long, 0.5–1 mm wide, largest near base, sessile, entire or the upper and floral bracts with marginal glands, acute, indurate-apiculate, often gland-tipped; stipular glands large, usually dark. Sepals ovate-acuminate, apiculate, 4–5 mm long, 1–1.2 mm wide, the margins with stipitate-glandular teeth. Petals yellow, slightly orange-tinged, oblanceolate-obovate, 7.5–8.5 mm long, pilose at base. Stamens 5, glabrous. Styles separate, 5.5–7 mm long. Fruit broadly ovate, 2.2 mm high, slightly puberulent, the false septa nearly complete, ciliate. Seeds reddish-brown, shiny, 1.3–1.5 mm long.

TYPE: México, Nuevo León, ca. 30 km ene. of Doctor Arroyo, 2.5 km ene. of San Antonio de Peña Nevada, w. base of Cerro Peña

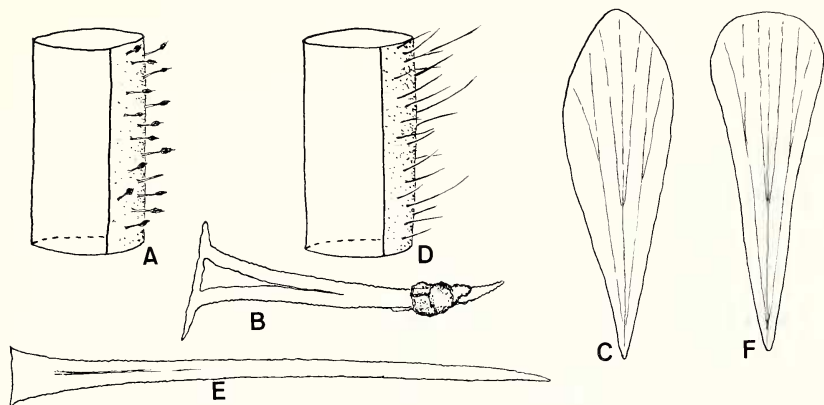


FIG. 2. Details of *Linum gypsogenium* and *L. scabrellum*. A-C. *L. gypsogenium* (type). A. Portion of stem. B. Stem trichome. C. Petal. D-F. *L. scabrellum* (Stanford et al. 2382-US). D. Portion of stem. E. Stem trichome. F. Petal.

Nevada, large area of gypsum outcrops, ca. 1980 m, 3-5 Aug 1981, *Nesom 4285b* (Holotype: US; isotype: MEXU).

The completely separate styles and fruits splitting into ten 1-seeded segments clearly place *Linum gypsogenium* in the "*Linum schiedeianum* group" as delimited by Rogers (1968). Further, the small leaves, stipular glands, and glandular toothed outer sepals are similar to features of *L. rupestre* (A. Gray) Engelm. ex Gray, *L. scabrellum* Planch., and *L. flagellare* (Small) Winkl.; among these, the new species would key to *L. scabrellum* in Rogers' treatment because of the hairiness of the stems and leaves, but the hairs are conspicuously gland-tipped (Fig. 2, A-B, D-E). This feature was not mentioned by Rogers and does not appear in any of the specimens of *L. scabrellum* I have examined from over its entire range (Oax., Pue., Hid., Que., S.L.P., Tam., and N.L.). Also in contrast to *L. scabrellum*, *L. gypsogenium* usually has markedly less dense pubescence of shorter hairs, smaller, more widely spaced (non-overlapping) upper leaves, marginal "teeth" of the sepals without large, dark, subterminal glands, and differently shaped petals (Fig. 2, C, F), those of *L. scabrellum* being strongly obtriangular.

Besides *Linum gypsogenium* and *L. scabrellum*, only two other species of American yellow-flowered *Linum* are consistently pubescent, *L. tenellum* Schlecht. & Cham. and *L. puberulum* (Engelm.) Heller, the latter of which is also in the "*schiedeianum* group" (Rogers 1968), and both of these have eglandular trichomes. The lower stems of *L. rupestre* rarely may be sparsely hairy, but the trichomes are also eglandular.

Linum gypsogenium apparently is allopatric or parapatric with *L.*

scabrellum, occurring at the northern tip of its range. The type of *L. macradenium* Brandg. (a synonym of *L. scabrellum*) was collected at Minas de San Rafael in San Luis Potosí, a gypseous area with many endemics about 200 km to the south of the Peña Nevada gypsum area, but these plants lack gland-tipped trichomes. The conversion into "glands" of the leaf and sepal apices noted by Rogers (1968) on the holotype of *L. macradenium* also occurs in other plants of *L. gypsogenium*. Other collections of *L. scabrellum* I have studied from gypseous substrate in the area of Minas de San Rafael do not show any of the features unique to the new species; I have concluded that *L. gypsogenium* is more than simply an ecotypically differentiated population of *L. scabrellum*, and as such, warrants recognition as a species. The occurrence of such edaphic endemism within *Linum* is not an isolated phenomenon, because Rogers (1968) has recognized another gypsophilous endemic from Nuevo León, *L. modestum* Rogers; it is also a member of the "*L. schiedeana* group," but among those species it is not closely related to *L. gypsogenium*.

At the type locality of *Linum gypsogenium*, *L. rupestre* also grows on the exposed gypsum and is more abundant than the new species; no intermediates between the two have been observed. *Linum schiedeana* is common in the gypseous soil of flat pastures in the immediate vicinity of the rock outcrops, but it was not collected on the outcrops proper.

ACKNOWLEDGMENTS

I thank the curators of TEX and US for loans of pertinent specimens.

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(Received 17 Sep 82; accepted 21 Dec 1982.)

Note added in proof: Further collections in 1983 have shown *Calochortus marcellae* to be relatively common on limestone outcrops up to about 3500 m elevation on Cerro Peña, Nevada.